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2001-2010: Decade to Roll Back Malaria in Developing Countries, particularly in Africa

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Note by the Secretary-General

The Secretary-General hereby transmits the report prepared by the World Health Organization, in accordance with General Assembly resolution 59/256.

Summary

The present report highlights the activities undertaken and progress made since the last report in meeting the 2010 malaria goals, in the context of General Assembly resolution 59/256 and the Abuja Declaration on Roll Back Malaria in Africa (2000). The efforts of the World Health Organization (WHO) and the Roll Back Malaria Partnership are presented, as are key issues in resource mobilization and financing, including the role of the Global Fund to Fight AIDS, Tuberculosis and Malaria. The access of people at risk to preventive measures and effective treatment for malaria and related issues are examined and reported in detail. While dozens of countries have followed WHO recommendations to change their treatment policies for malaria, there are significant obstacles to the implementation of those new policies. The main difficulties are caused by insufficient financial resources, inadequate health systems and a shortage of health care personnel. The report also provides updates on efforts to create stable supplies and increase access to the latest generation of antimalarial medicines, artemisinin-based combination therapy and long lasting insecticidal nets. Progress on strengthening human resource capacity and research and development are also described.

New initiatives that will substantially increase funding for malaria control include the World Bank Booster Project, the United States Government's new international malaria initiative, the Malaria Control and Evaluation Partnership in Africa, funded by the Bill and Melinda Gates Foundation, and the pledge made at the 2005 Group of Eight Summit to contribute more funds to malaria control.

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The report concludes with a recommendation for actions that could be taken by the General Assembly in line with the Millennium Project report on malaria and the resolution on malaria adopted by the World Health Assembly in 2005 to help accelerate progress in meeting the goals of the Decade.

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I. Background

1. In its resolution 59/256 entitled "2001-2010: Decade to Roll Back Malaria in Developing Countries, Particularly in Africa", the General Assembly took note of the declarations and decisions adopted by the Organization of African Unity, in particular the declaration and plan of action on the "Roll Back Malaria" initiative adopted at the Extraordinary Summit of the Heads of State and Government of the Organization of African Unity, held in Abuja on 24 and 25 April 2000, and recognized the linkages in efforts being made to reach the targets set in the Abuja Summit as necessary and important for the achievement of the "Roll Back Malaria" goals and the targets of the United Nations Millennium Declaration, by 2010 and 2015, respectively. In its resolution, the Assembly recognized the urgent need for scaling up national malaria control programmes if African countries were to meet the intermediate target set by the Abuja Summit for the five-year period 2000-2005. It also emphasized the importance of implementing the Millennium Declaration and welcomed the commitment of the Member States to respond to the specific needs of Africa, while commending the efforts of the World Health Organization (WHO), the United Nations Children's Fund (UNICEF) and other partners for their efforts, including the launch of the Roll Back Malaria Partnership in 1998.

2. In the same resolution, the Assembly called for support for the recommendations contained in the report of the Secretary-General (A/59/261). In summary, these were to: (a) call upon the international community to continue to support the "Roll Back Malaria" partner organizations, including WHO and UNICEF, as vital complementary sources of support for the efforts of malaria-endemic countries to combat the disease; (b) ensure that the Global Fund to Fight AIDS, Tuberculosis and Malaria receive increased funding to support sound national plans to control malaria; (c) urge malaria-endemic countries to increase domestic resource allocation to malaria control; (d) encourage African countries that had not yet done so to implement the recommendations of the Abuja Declaration to waive taxes and tariffs on nets, netting materials and other products needed for malaria control; (e) call upon malaria-endemic countries to strengthen policies and programmes to ensure a rapid scale-up in the coverage of insecticide-treated nets to at least 60 per cent of those at risk, where the use of such nets was the vector-control method of choice, by applying expeditious approaches, including targeted free or subsidized distribution to vulnerable groups; (f) encourage Member States experiencing drug resistance to conventional monotherapies to replace them with combination therapies as recommended by WHO; and (g) recognize the importance of developing effective vaccines and new medicines to prevent and treat malaria.

3. In the same resolution, the Assembly reiterated the need for expanded public-private partnerships for malaria control and prevention. In particular, it urged the petroleum companies operating in Africa to provide polymer to manufacturers of mosquito nets at reduced prices, and called upon the international community (a) to support ways to expand access to artemisinin-based combination therapy for populations at risk of exposure to resistant strains of falciparum malaria, including commitment of new funds, innovative mechanisms for financing and national procurement of artemisinin-based combination therapy and the scaling up of artemisinin production to meet the increased need; and (b) to support investment in the development of new antimalarial medicines and insecticides. The international community was also called upon to support coordinated efforts to improve

surveillance, monitoring and evaluation systems so as to better track and report changes in the coverage of recommended Roll Back Malaria interventions and subsequent reductions in the burden of malaria.

4. The Secretary-General was requested to collaborate closely with WHO, UNICEF, developing countries and regional organizations, including the African Union, in conducting in 2005 an evaluation of the measures taken and progress made towards the achievement of the mid-term targets, the means of implementation provided by the international community in this regard and the overall goals of the Decade, and to report thereon to the General Assembly at its sixtieth session. In addition, the Secretary-General was requested to report to the General Assembly on the implementation of the resolution.

II. Roll Back Malaria Partnership

5. The Roll Back Malaria Partnership, launched in 1998 by WHO, the World Bank, UNICEF and the United Nations Development Programme (UNDP), includes malaria-endemic countries, their bilateral and multilateral development partners, the private sector, non-governmental and community-based organizations, foundations, and research and academic institutions. All these constituencies are represented on the Roll Back Malaria Partnership Board.

6. The Roll Back Malaria Partnership secretariat, hosted by WHO, is responsible for optimizing support for country-level efforts and ensuring that contributions from individual partners are coordinated and focused on the needs of countries in line with best-practice recommendations and technical norms and standards. The secretariat, led by the Executive Secretary of the Roll Back Malaria Partnership, operates at the global, regional, subregional and country levels. Its four main areas of work at the global level are: (a) partnership development and networking; (b) country support development; (c) communication and advocacy; and (d) resource mobilization and financing.

7. The Partnership's working groups are responsible for establishing consensus on best practices for scaling up malaria control. The Partnership has adopted several consensus statements and has developed an overarching Roll Back Malaria Global Strategic Plan 2005-2015, which charts the way for partners to achieve 80 per cent coverage of populations with all Partnership interventions, a 50 per cent reduction in the burden of malaria by 2010, and the achievement of the Millennium Development Goals by 2015.

8. At the regional level, the Roll Back Malaria Partnership secretariat has served as a liaison between regional partners such as the African Union, the Economic Community of West African States, the New Partnership for African Development, the Southern African Development Community, WHO and UNICEF regional offices and other regional initiatives. The Partnership's subregional networks in Central, East, Southern and West Africa facilitate coordination of partner support for scaling up malaria control, for example, by supporting countries to implement grants from the Global Fund to fight AIDS, Tuberculosis and Malaria. They have also facilitated the smooth introduction of new initiatives such as the Malaria Control and Evaluation Partnership in Africa, a pilot project to promote rapid scale-up in selected counties (see para. 15), and are currently working with the World Bank on its new Malaria Booster Project.

9. The Roll Back Malaria Partnership's advocacy efforts over the past year have included: (a) coordination of high-level advocacy events, such as the Africa Live Roll Back Malaria Concert in Dakar and the launch of the World Malaria Report in three global capitals; (b) developing targeted advocacy strategies for the United Kingdom of Great Britain and Northern Ireland, the European Union and the United States of America (including United States congressional briefings and British and European Union parliamentary meetings), publishing key reports and facilitating the broadcast of television documentaries, as well as global media outreach; (c) coordination and support for Africa Malaria Day 2005 activities at the global, regional and country levels; (d) ensuring visibility of Roll Back Malaria in the calendars of key United Nations, international, regional and country meetings and events highlighting malaria issues and progress; and (e) production and maintenance of a range of Roll Back Malaria partnership advocacy tools, including a new brochure and other materials.

10. Ensuring efficient procurement of antimalarial commodities is essential if countries are to scale up interventions. Some key commodities such as artemisinin-based combination therapies and insecticide-treated nets are not yet produced in large enough quantities because manufacturers lack confidence in the market. The Roll Back Malaria Partnership's Malaria Medicines and Supply Service is working to remove such obstacles. The service now carries out global forecasting of supply and demand, communicates with manufacturers on production needs, supports country procurement actions, and monitors funding for antimalarial commodities. It has also finalized a database and forecasting tool that gives countries, manufacturers and donors a clear overview of supply and demand for high-quality antimalarial products.

III. Funding and resource mobilization

11. The global resources needed to effectively roll back malaria are estimated at approximately $2 billion per year for Africa and $1 billion for the other malaria-endemic regions of the world. Those figures take into account the need for artemisinin-based combination therapies, which are far more costly than previous monotherapies, in countries with drug-resistant falciparum malaria. At current prices, the said therapies for the more than 600 million people exposed to malaria in Africa alone will cost about $1 billion per year. Prices of combination therapies are expected to decrease to some extent as early as 2006, when demand and production have stabilized at higher levels. Furthermore, increased coverage by insecticide-treated nets and the use of diagnostic tools are likely to reduce expenditures on medicines in the long term.

12. The Global Fund to Fight AIDS, Tuberculosis and Malaria, which started its operations in 2002, has become an important international source of funding for malaria control. By the end of 2004, the Fund had allocated $1.8 billion on a five-year basis for malaria control in 69 countries, including 38 in Africa. The approved two-year budget totals $995 million (or 22 per cent of the total disbursements) and the approved commitment for 2005 and 2006 totals $881 million. The Round Five call for proposals in 2005 has elicited malaria proposals from 62 countries, for a total request of approximately 1.9 billion over five years. The current five-year allocations are meant to fund a total of 145 million artemisinin-based combination therapy treatment courses and 108 million insecticide-treated nets. To date, there has

been a delay in the first stage of implementation, which is understandable, considering its scale. By mid-2005, 12 malaria grants totalling $148 million had passed into phase II operations. In 2005, Roll Back Malaria partners, in particular, WHO country, regional and headquarters offices, have responded to requests from 43 countries to assist in developing Fund proposals, as well as to address critical technical issues pertaining to interventions to be selected and quickly scaled up.

13. Other resource flows for malaria control are more difficult to track, in particular out-of pocket expenditures and public funding embedded in the provision of basic public health services, which are increasingly financed through broad budget support programmes. In 2004 and 2005, the Roll Back Malaria Partnership has worked towards improving resource allocations for malaria at the country level to complement funding available from the Global Fund and external donors. Coordinating optimal use of these resources is increasingly challenging due to the introduction of interventions that are both new to countries and more expensive. Increasing and competing demands for resources at the country level require programmes to show progress towards agreed goals and efficiency in the use of allocated resources. The Partnership is supporting the development of new tools to improve planning and monitoring of malaria-control programmes, such as an electronic cost-estimation tool, which is available on the Internet.

14. In April 2005, the World Bank announced it would substantially increase its support to combat malaria in the context of its new global strategy, supported by a booster project that would make funding available to countries to enhance their own programmes to fight malaria. The Bank believes that a total commitment of $500 million to $1 billion is feasible over the next five years, including anticipated co-financing from partners. The Bank will itself mobilize financial and technical resources, and activate support from the development community and private sector to expand access to prevention and treatment and to improve sustainability. Such efforts are intended to increase the availability of commodities, encourage countries to lower taxes and tariffs on such items, improve and maintain long-term malaria control by Governments and civil society groups and build public-private partnerships.

15. In May 2005, during the fifty-eighth World Health Assembly in Geneva, the Malaria Control and Evaluation Partnership in Africa — an in-country collaboration between the Program for Appropriate Technology in Health (an international, non-profit organization), the Government of Zambia and the Zambia Roll Back Malaria Partnership — was launched. Its goal was to accelerate and document the impact of progress towards meeting Zambia's malaria control targets. The immediate goals of the new partnership are to support coordination of rapid scale-up using proven malaria control strategies — including insecticide-treated nets, indoor mosquito control and effective medication — to reach 80 per cent of Zambia's population and to cut deaths due to malaria by 75 per cent within three years. The initiative, supported by a new, nine-year $35 million grant from the Bill and Melinda Gates Foundation, is intended to serve as a model for other African nations.

16. In June 2005, the United States Government announced a new international malaria initiative that would target up to 35 high-burden countries over five years. Initially, three countries — the United Republic of Tanzania, Uganda and Angola — will be targeted. At present, the United States of America contributes $200 million annually through bilateral programmes and the Global Fund to Fight AIDS,

Tuberculosis and Malaria. President Bush proposed a $30 million increase for 2006, $135 million more for 2007, and an additional $300 million increase per year from 2008 to 2010. The United States of America will also ask other major donors to provide $1.2 billion per year. The objective is to exceed the 2015 Millennium Development Goals for malaria.

17. In its communiqué following the Gleneagles Summit held in July 2005, the Group of Eight made a commitment to work with African countries to scale up action against malaria to reach 85 per cent of vulnerable populations through key interventions that could save lives and reduce the drag on African economies from this preventable and treatable disease. The communiqué called for an additional $1.5 billion annually to help ensure access to insecticide-treated nets, artemisinin-based combination therapies, intermittent preventive treatment for pregnant women and infants, indoor residual spraying and building the capacity of African health services.

IV. Access to effective treatment for malaria

18. Malaria-endemic countries have, for the most part, shifted their treatment policy for *Plasmodium falciparum* malaria, away from previously used single medicines, which have lost effectiveness due to parasite resistance. To date, 53 countries — 32 of them in Africa — have adopted the artemisinin-based combination therapies recommended by WHO as their first- or second-line treatment.

19. WHO has provided technical assistance to the ministries of health of malaria-endemic countries to enable the new policies based on the monitoring of therapeutic efficacy to be adopted. A global report on the state of antimalarial drug resistance will be launched in September 2005. Countries are now beginning to implement the new combination treatments, with WHO assistance for the preparation of national treatment guidelines, the training of health workers and the launch of implementation research on the use of the treatments at the community level.

20. The rapid shift to artemisinin-based combination treatment policies by countries in 2004 and 2005 and the resulting surge in demand – from 2 million treatment courses in 2003 to 30 million courses in 2005 — has led to a shortfall of artemisinin and artemisinin-based combination therapies. The internationally financed demand for artemisinin-based combination therapies in 2006 is expected to exceed 100 million courses. Over the past year, industry has made major efforts to step up production of artemisinin-based combination therapies, while measures have been taken to ensure that the shortfall will be reduced by the end of 2005. Artemisia annua, the source of artemisinin, has been cultivated in several countries since 2004-2005. While the largest producers are still China and Viet Nam, East African countries (Kenya, Uganda and the United Republic of Tanzania) are now scaling up production and are expected to account for about 20 per cent of world production by the end of 2006. Although demand is expected to increase over the next 3 to 4 years, there is concern that production might increase too rapidly and that plant production might be started in some places without access to industrial extraction of the active ingredient. To improve the linkages between agricultural production, ingredient extraction and the manufacture of finished pharmaceuticals, WHO and the Malaria Medicines and Supply Services convened a meeting in Arusha (United Republic of

Tanzania), in June 2005, that brought together all actors engaged in artemisinin-based combination therapy production. In addition, the Food and Agriculture Organization of the United Nations (FAO) and WHO have initiated a collaborative programme for continuous exchange of information on technical issues, production and demand.

21. To ensure the quality of products, an international mechanism to pre-qualify manufacturers of artemisinin compounds and artemisinin-based combination therapies has been established by WHO and UNICEF. Products and manufacturers that comply with internationally recommended standards are included in a list, which is published as a guide to all United Nations agencies and others involved in procuring artemisinin-based combination therapies. To date, one manufacturer of an artemisinin-based combination therapy (artemether-lumefantrine (Coartem®)) and two manufacturers of artesunate tablets have been pre-qualified. A broader selection of therapies, greater competition among producers, increased global financing and appropriate policies for health financing at the country level are now required.

22. New antimalarial medicines are needed to replace those being lost to parasite resistance. Investments in drug development for diseases of the poor, such as malaria, which have a low return on investment, are not among the priorities of the pharmaceutical industry. Recognition of this fact led to the establishment in 2001 of a non-profit private-public foundation called the Medicines for Malaria Venture, whose work is described in paragraph 44 below.

23. In April 2005, the Drugs for Neglected Diseases Initiative and Sanofi Aventis announced plans to develop and seek pre-qualification for two new fixed-dose artemisinin-based combination therapies combining artesunate with amodiaquine and artesunate with mefloquine. Their aim is to submit the first marketing authorization application by late 2005 or early 2006. The partners claim that the new co-formulations will be less expensive than existing artemisinin-based combination therapies.

24. Rational use of parasite-based diagnosis could reduce expenditure for antimalarial medicines. Diagnosis by microscopy has not been used in many malaria-endemic countries due to a shortage of skilled personnel. More recently, simple rapid diagnostic tests have become available. WHO and Roll Back Malaria partners are working on the establishment of quality assurance for these products and services and an operational research agenda to assess the feasibility and cost-effectiveness of using them at the service delivery level. Currently, most malaria cases, especially in Africa, are detected in the home and treated with medicines that have been acquired outside formal health services. Research supported by the UNICEF/UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases has shown that home management of malaria, a package including education of mothers, training of community-level providers and supply of pre-packaged quality medicines, can reduce malaria mortality and morbidity. The package will need to be fully implemented in areas of high malaria transmission to ensure early access to prompt and effective treatment. Projects in a number of African countries seek to establish the feasibility, acceptability and effectiveness of using artemisinin-based combination therapies in the context of home management of malaria.

V. Coverage of malaria vector control

25. According to household surveys, there has been some increase in the coverage of insecticide-treated nets in African countries.[1] This improvement has been facilitated by: (a) a greater investment of national and international funds; (b) rationalization of taxes and tariffs on bed nets, netting materials and insecticides by most African Governments; (c) the fact that since 2002, several countries have begun providing insecticide-treated nets free of charge, or at highly subsidized prices, to children under five years of age and pregnant women; and (d) social marketing of insecticide-treated nets and their increased local production. Surveys of net use in Africa reveal that 10 to 30 per cent of the population uses untreated nets, while the percentage using insecticide-treated nets is lower.

26. The Roll Back Malaria Partnership has focused considerable effort on determining the most effective ways to deliver insecticide-treated nets to vulnerable populations. Experience has shown that the distribution of nets or net vouchers can be successfully integrated into antenatal care and/or an expanded programme of immunization services. The UNICEF-supported Accelerated Child Survival and Development programme, implemented in 11 West African countries, has demonstrated significant increases in insecticide-treated net coverage among infants and pregnant women through such routine services. In Ghana, Zambia and, more recently, Togo, the combination of measles vaccination campaigns with insecticide-treated net distribution has been very successful in rapidly increasing net coverage in vulnerable groups. An integrated systems approach provides the opportunity for countries to rapidly reach their short-term targets for insecticide-treated net coverage. Experience suggests that net distribution stimulates demand and increases coverage for immunization and antenatal care services.[2] Integration with either or both such services can also be undertaken through social marketing, e.g. delivering highly subsidized nets to pregnant women and children through antenatal clinics. Malawi has achieved an estimated 55 per cent insecticide-treated net coverage of households by using this approach, at the same time ensuring equity. Programmes to increase insecticide-treated net coverage may also include control activities for other diseases, e.g. the elimination of lymphatic filariasis, deworming and distribution of micronutrients.

27. Long-lasting insecticidal nets, which maintain their efficacy without retreatment for four to five years, represent an important innovation that could facilitate sustainable scale-up of malaria prevention. The price of nets of this type has fallen to approximately $5, making them a more cost-effective option than conventional insecticide-treated nets. They currently account for about 80 per cent of bednet requests from countries in Africa in their applications to the Global Fund, and 90 per cent of all nets funded through bilateral and other funding sources. The demand for long-lasting insecticidal nets has rapidly increased since 2004, and now outstrips their production, with some countries currently experiencing delays of up to several months in procuring them. The first African factory to manufacture such nets, the object of a transfer of technology engineered by Roll Back Malaria partners, opened in Arusha (United Republic of Tanzania), in November 2004. More efforts are needed to increase capacity for local production of insecticide-treated nets in Africa.

28. Indoor residual spraying is a highly effective method for malaria vector control that is particularly useful when a rapid effect is needed, particularly in epidemics

and other emergency situations. It is an integral component of the national malaria control programme strategies of almost half of the malaria-endemic countries in Southern and Eastern Africa, most of those in Asia, and in Latin America. While Asian and American countries are in many endemic areas seeking to replace indoor residual spraying with insecticide-treated nets, an increasing number of countries in Africa now use it for mosquito control in epidemic-prone areas.

29. The first meeting of the Conference of the Parties of the Stockholm Convention on Persistent Organic Pollutants was held in Uruguay from 2 to 6 May 2005. The Conference noted the need for countries that were currently using DDT for disease vector control to do so until appropriate and cost-effective alternatives became available. The Conference also urged the strengthening of the capacity of countries to effectively implement and evaluate the impact of the use of DDT and its alternatives, and requested the financial mechanism of the Convention to support efforts to develop and deploy cost-effective alternatives to DDT (such as insecticides for indoor residual spraying, long-lasting insecticide-treated materials and non-chemical alternatives), inviting the support of other international financial institutions.

VI. Malaria in pregnant women and infants

30. An estimated 10,000 pregnant women and 200,000 infants die each year in Africa as a result of falciparum malaria infection during pregnancy. Malaria in pregnancy increases the risk of spontaneous abortion, stillbirth, premature delivery and low birth weight. Furthermore, in areas of low or seasonal transmission, pregnant women with little or no immunity to malaria are at increased risk of dying from malaria complications. Co-infection with HIV exacerbates all aspects of malaria in pregnancy. WHO recommends a three-pronged strategy for reducing the impact of malaria in pregnant women: (a) intermittent preventive treatment for asymptomatic malaria infection in areas of moderate or high transmission of falciparum malaria; (b) use of insecticide-treated nets; and (c) prompt access to effective treatment for malarial illness. Now an integral part of the "making pregnancy safer" strategy, intermittent preventive treatment has been adopted as policy by 24 countries in Africa. Implementation is ongoing in at least 11 of these countries, and covers more than 50 per cent of all districts in six of them. At present, sulfadoxine-pyrimethamine is the only antimalarial drug for which there is adequate data on efficacy and safety for use as an intermittent preventive treatment. Increasing resistance of the malaria parasite to the drug makes evaluation of alternative antimalarial medicines for preventive treatment an urgent priority.

31. Five countries in Eastern and Southern Africa (Kenya, Malawi, Uganda, Zambia and the United Republic of Tanzania) have formed a coalition of malaria and reproductive health programmes (Malaria in Pregnancy Eastern and Southern Africa Coalition) to reduce the impact of malaria in pregnancy through collaboration between malaria and reproductive health programmes. The experience gained by these countries in including malaria in pregnancy control programmes is now being documented and shared with other countries in the region. A similar partnership, the Réseau d'Afrique de l'Ouest contre le paludisme pendant la grossesse, operates for countries in the West Africa subregion. Implementation guidelines and a monitoring and evaluation framework for malaria in pregnancy are under development.

32. Severe malarial anaemia takes a heavy toll on children living in malaria-endemic regions of Africa, with the greatest burden and highest mortality occurring in infants. Evidence from the United Republic of Tanzania suggests that intermittent preventive treatment could be a valuable strategy for the control of malaria and anaemia in this vulnerable group, since the administration of a curative dose of sulfadoxine-pyrimethamine to asymptomatic infants who were receiving routine vaccinations at 2, 3 and 9 months of age reduced episodes of malaria and anaemia by at least 50 per cent. Intermittent preventive treatment for infants shows considerable promise as a potential malaria control strategy, since sustainable delivery may be achieved through an expanded programme of immunization. However, more evidence of efficacy and safety is needed from a range of epidemiological settings before such treatment can be recommended for inclusion in national malaria control policies. A consortium of researchers, working with WHO and UNICEF, is addressing these issues with funding from the Bill and Melinda Gates Foundation.

33. The United Nations Foundation and the Canadian International Development Agency have taken the initiative to establish broad collaboration on rapid scale-up to ensure that all pregnant women and children under 5 years (approximately 120 million persons) in sub-Saharan Africa receive effective prevention against malaria. A first meeting of public and private stakeholders was held in Geneva in June 2005.

VII. Malaria epidemics and complex emergencies

34. Over 30 per cent of global malaria mortality is estimated to occur in countries affected by complex emergency situations. Some 16 countries in Africa are currently affected by complex emergencies or massive refugee crises, while 26 (including large countries such as Nigeria, the Democratic Republic of the Congo, the Sudan and Ethiopia) are considered "fragile States". Population movements and displacement, increased vulnerability due to malnutrition and concurrent infections, poor or non-existent housing, the collapse of health services, poor coordination among health agencies, ongoing conflict limiting access and environmental deterioration resulting in increased vector breeding all contribute to a heavier malaria burden in affected populations. Malaria control in complex emergencies requires specially adapted strategies. In November 2004, WHO organized a consultation meeting with major partners during which evidence-based best practices for acute and chronic emergency situations were developed. One sobering finding of that meeting was the absolute need for services free of charge to users for the duration of the emergency if mortality was to be reduced. As a follow-up to the meeting, the Malaria in Emergencies Network was set up in 2005. WHO also helps countries and agencies to implement effective malaria control through the development of guidelines, the mobilization of partners to draw up national strategic plans, including proposals for the Global Fund to Fight AIDS, Tuberculosis and Malaria and the posting of experienced international staff in countries. The funds available at the country level need to be matched by sound technical advice and assistance to achieve the best public health outcomes.

35. Up to 144 million people in Africa currently live in areas at risk of epidemic malaria. Epidemics cause up to 12 million malaria episodes and between 155,000 and 310,000 deaths per year among people of all ages in Africa alone.

Because resources are not sufficient to address the day-to-day health-care needs of malaria-affected populations, it is difficult for countries to allocate resources for epidemics, which by nature cannot be easily predicted. To address epidemic malaria, WHO has supported efforts to improve preparedness, early recognition and effective and timely response mechanisms, including deployment of malaria early warning systems that use remote sensing. Eight African countries (Eritrea, Ethiopia, Kenya, Mali, the Niger, Senegal, Uganda and Zambia) have included early warning systems with climate and vulnerability monitoring in their application to the Global Fund to Fight AIDS, Tuberculosis and Malaria. Weekly disease surveillance through sentinel sites is now conducted in at least 15 of the 25 epidemic-prone countries in Africa. WHO guidelines on the prevention and control of malaria epidemics are available. The Roll Back Malaria/Sahel project will map epidemic risk areas and climatic variables across a large part of West Africa.

VIII. Capacity-strengthening and human resources

36. Most malaria-endemic countries, particularly those in sub-Saharan Africa, have health systems that are inadequate to the task of implementing effective interventions against malaria and other high-burden diseases. Countries in the region face the challenges associated with insufficient human resources, knowledge and capacity to scale up interventions and measure results. Capacity-building efforts should focus on adequate diagnosis and case management services, epidemiological and operational knowledge, and monitoring and evaluation. For proper planning and implementation of vector control, a range of technical skills for integrated vector management are needed, complemented by managerial skills. Control programmes also need to build their capacity for engaging other health programmes, communities, the private sector and non-governmental organizations.

37. Responding to increased international support and funding, WHO and other partners have supported countries in the application and implementation of Global Fund grants and resources from other donors. Malaria-endemic countries have been reorienting their programmes from strategic planning to building capacities in the health system for large-scale implementation.

38. The capacity-development activities of WHO centre on creating an enabling environment through training and institutional strengthening and networking. Over the past two years, national programme officers from over 24 African countries have been trained. International and national in-service training curricula on malaria control have been reviewed and developed in the light of the current knowledge gaps and intervention strategies.

39. A capacity assessment tool to help in strategic planning and prioritization has also been developed and piloted in Malawi and Rwanda. Other countries from the Eastern Mediterranean region are conducting similar assessments.

40. A package for district malaria control integrating all malaria-related activities into other major health programmes is currently under development. The product will be aimed at enhancing the capacity of district health teams.

IX. Research and development

41. Global investments in malaria research and development have increased steadily since the launch of the Roll Back Malaria initiative. Dedicated research and development programmes, such as the UNICEF/UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases, continue to function in close collaboration with the Roll Back Malaria Department of WHO. Other major research partners include the Bill and Melinda Gates Foundation, with its Grand Challenges in Global Health initiative; the Multilateral Initiative for Malaria, currently hosted by Sweden, which is continuing to build research capacity in Africa; the Medicines for Malaria Venture; and the Malaria Vaccine Initiative.

42. In the pharmaceutical research arena, the Special Programme for Research and Training in Tropical Diseases has continued its work on artemisinin-based combination therapy and has also made substantial progress on rectal artesunate, which is intended for use as an emergency treatment for severe malaria. Rectal artesunate is already being manufactured by the pharmaceutical industry and is available to countries, and the work necessary for the registration of the product is now largely complete.

43. The Special Programme for Research and Training in Tropical Diseases is currently assessing the utility of rapid non-microscopic diagnostic procedures for malaria. Rapid diagnostic tests are expected to be useful for predicting and following the spread of epidemics and monitoring treatment, and thus to more efficient use of antimalarials. Mathematical models of the effects of introducing such tests have been developed and detailed plans drawn up, in collaboration with the WHO Regional Office for the Western Pacific, to ensure the quality of the tests through a network of malaria reference centres. The development of a tool package for detecting and monitoring resistance, based on in vitro drug susceptibility testing and parasite genotyping by the polymerase chain reaction, is nearing completion. This research has already been useful for the revision of WHO guidelines on resistance-monitoring policy.

44. In genetics, the Special Programme has focused on research to better utilize genomic information for the development of drugs, vaccines and diagnostics. It has also explored functional genomics derived from the Anopheles gambiae sequence, as well as the ethical, legal and social implications of using genetically modified mosquitoes for malaria control. Results in 2004 included the identification of several immune response genes that could be targeted to inhibit growth of the malaria parasite in the mosquito.

45. The Medicines for Malaria Venture is a not-for-profit organization dedicated to discovering, developing and delivering antimalarials for populations of disease-endemic countries. The goal of the Venture, which collaborates with public and private pharmaceutical, biotech and research institute partners around the world, is to develop safe, effective and affordable antimalarials for less than $1 per adult treatment, in order to reach the greatest number of people with malaria. The Venture has made it a priority to develop drugs with low intrinsic "cost of goods", in part by focusing on simple process chemistry and in part by manufacturing in regions that offer more competitive costs. With more than 20 projects in the pipeline, the Venture today manages the largest portfolio of malaria drug research in history. There are currently seven new drugs in clinical trials, two of which are already in large, late-

stage efficacy trials. A new antimalarial combination treatment could be available by the end of 2007.

46. Despite decades of research, the development of an effective malaria vaccine has been more complex than expected. The mapping of the malaria genome has revealed more than 5,000 potential target antigens, though the antigens that induce key protective immune responses in human hosts have yet to be identified. Full knowledge of the protective immune mechanism of malaria, which could guide decisions in vaccine development, is still to be attained. Without it, vaccine development remains essentially empirical and must be done through efficacy trials in endemic countries. The WHO Initiative for Vaccines Research and the Special Programme work together to support activities that contribute to the strengthening of this empirical approach while simultaneously pursuing biological understanding and knowledge of protective immune mechanisms. Given the potential public health impact and benefit of an effective malaria vaccine, private and public investment in malaria vaccine development should be increased, with cooperation among researchers, institutions, vaccine developers and funding agencies intensified in order to meet this global challenge.

X. Progress towards the Abuja goals

47. A preliminary report on the implementation of the Plan of Action of the Abuja Declaration published by the WHO Regional Office for Africa indicates that all surveyed countries (39) report having a national health policy. The vast majority of countries (92 per cent) have district health plans, which reflect the national health policy. In addition, 97 per cent of these countries have basic intervention packages (including anti-malaria ones), which are being implemented in over 80 per cent of health facilities in 70 per cent of the countries.

48. Among 34 African countries from which the information is available, national health expenditures range from 1 to 20 per cent of the Government budget, with a median of 8 per cent. Only one country (Zimbabwe) has met or exceeded the goals of the Maputo Declaration of July 2003, at which the African Union committed to the allocation of at least 15 per cent of Government budgets to health. Only one third of the countries provided information on the distribution of the health budget among primary, secondary and tertiary care. The allocation of the health budget to primary care ranged from 17 to 54 per cent, with a median of 32 per cent. On the other hand, the health budget distribution to secondary and tertiary care ranged from 10 to 60 per cent (median 22 per cent) and from 10 to 46 per cent (median 25 per cent) respectively.

49. All African countries have a national antimalarial treatment policy. About two thirds have changed their antimalarial treatment policy since 1998 in response to the emergence of drug-resistant falciparum malaria. Among countries that have changed their antimalarial treatment policy, 65 per cent did so after the adoption of the Abuja Declaration in 2000. To date, 34 African countries have adopted WHO-recommended artesiminian-based combination therapies. In addition, the vast majority of countries (over 80 per cent) have protocols for referring patients with severe illnesses from front-line facilities to the next level of the health-care system. The vast majority of countries (92 per cent) use the integrated disease surveillance and response system, which covers malaria. However, of the 31 countries that have

adopted the system, only half are in the implementation phase. All malaria-endemic countries have an integrated management of childhood illnesses programme.

50. The 35 demographic and health surveys or multiple indicators cluster surveys conducted between 1998 and 2004 in African countries showed that the percentage of children under 5 years of age with reported fever and that had received antimalarial treatment ranged from 3 to 69 per cent, with a median of 50 per cent. However, most antimalarial treatments could not be considered effective. In 2001, surveys showed that only 3 per cent of children under 5 years of age had slept under an insecticide-treated net the night preceding the survey. Current coverage is likely to be much higher, given the recent scale-up of treated net distribution.

XI. Monitoring and evaluation

51. The first *World Malaria Report*, published by WHO and UNICEF in 2005, provided an update on the epidemiological situation and progress made in the implementation of controls in all malaria-endemic countries throughout the world, and on the support provided by the international community. Data, which were mainly from the period 1998 to 2003, provide a baseline from which to evaluate progress by 2006 and 2010.

52. The Monitoring and Evaluation Reference Group, established as an advisory body of Roll Back Malaria partners in 2003 and co-chaired by WHO and UNICEF, continues its development of robust systems to reliably monitor the malaria situation and evaluate the effectiveness of Roll Back Malaria interventions. The Group has established task forces on five priority issues: (a) malaria mortality trends; (b) malaria prevalence indicators; (c) malaria-related anaemia; (d) strengthening of national monitoring and evaluation capacity for Roll Back Malaria activities; and (e) population-based surveys. In 2004, a malaria indicator survey tool was developed. All meeting reports from the Group and its task forces are available on the Roll Back Malaria Partnership website (www.rollbackmalaria.org).

53. The 2005-2006 multiple indicators cluster surveys, which are expected to include 46 malaria-endemic countries, will provide important indicator data for evaluating achievement of the 2005 Abuja targets. The data will become available in 2006.

XII. Conclusions and recommendations

54. **In January 2005, the United Nations Millennium Project published a report entitled "Coming to grips with malaria in the new millennium", prepared by the Working Group on Malaria of the Project's Task Force on HIV/AIDS, Malaria and Tuberculosis and Access to Essential Medicines. The report draws attention to malaria control as an integral part of a comprehensive development framework with a key role in poverty reduction. It notes that five years after the launching of the Roll Back Malaria initiative, country-level implementation of malaria control efforts has been severely limited because of a lack of resources. Although the situation has improved since 2002 thanks to an influx of additional resources for malaria control from the Global Fund to Fight AIDS, Tuberculosis and Malaria, more resources must**

be mobilized to meet needs. The report identifies the following set of critical issues for priority action:

(a) Establishment of a realistic and measurable target on malaria. Because the established Millennium Development Goal target on malaria — to halt and begin to reverse the incidence of malaria by 2015 — is difficult to measure and interpret, the Working Group on Malaria proposes a more measurable target: to reduce malaria morbidity and mortality by 75 per cent by 2015 from the 2005 baseline level. The proposed target and time line are consistent with the Millennium Development Goals for improved maternal health and reduction of child mortality, because children under 5 years of age and pregnant women are the most vulnerable to malaria;

(b) Enhancing commitment at the country and global levels;

(c) Strengthening health systems at the national and district levels;

(d) Development of human resources for programme implementation;

(e) Promotion of social mobilization and community participation;

(f) Provision of effective antimalarial supplies and commodities. Antimalarial medicines, insecticide-treated nets and insecticides for indoor residual spraying (mainly DDT and pyrethroids) should be considered public goods and made available free of charge to residents of malaria-endemic sites;

(g) Application of an integrated package of interventions. The Working Group on Malaria endorses the Quick Wins initiative described in the 2005 report by the United Nations Millennium Project entitled "Investing in Development", in particular with regard to insecticide-treated mosquito nets being distributed to all children in malaria-endemic areas by 2007. Because of the tremendous potential to save lives, especially in sub-Saharan Africa, the Working Group believes that the target of 100 per cent insecticide-treated net coverage among children should be an urgent international priority. Such a comprehensive strategy would promote the cognitive development and school attendance of young children;

(h) Scale-up of malaria control efforts to the national level;

(i) Promotion of social and economic development. Although the main objective is to reduce malaria-related mortality and morbidity, antimalarial intervention strategies should also promote social and economic development. Sustainability requires strategies designed to eliminate transmission in those sites that potentially generate wealth or that could promote social development. Wealth-generating sites include those that are devoted to the tourism, mining and manufacturing industries, as well as port facilities. Social development is promoted in schools and administrative centres;

(j) Incorporation of malaria prevention and treatment approaches into school curricula;

(k) Development of surveillance systems for early detection of malaria epidemics;

(l) Promotion of partnerships for malaria control;

(m) **Securing affordable access to the latest medical and therapeutic discoveries. Development of sound policies to address the threat to health security due to the sharp increase in the prices of medicines and other commodities is required. To protect poor nations from such a threat, relative policies should envision a national patent regime to secure affordable access to the latest medical and therapeutic discoveries. Commitment is also required from the international community to alleviate the restrictive features of the Trade-Related Aspects of Intellectual Property Rights agreement in its application to the health sector;**

(n) **Investment in research and development on malaria control tools.**

55. **In May 2005, the fifty-eighth World Health Assembly took stock of the situation of malaria and of efforts to roll back malaria in the world after which it adopted resolution 58/2, urging WHO member States:**

(a) **To establish national policies and operational plans to ensure that at least 80 per cent of those at risk of or suffering from malaria benefit from major preventive and curative interventions by 2010, in accordance with WHO technical recommendations, so as to attain a reduction in the burden of malaria of at least 50 per cent by 2010 and 75 per cent by 2015;**

(b) **To assess and respond to the need for integrated human resources at all levels of the health system in order to achieve the targets of the Abuja Declaration on Roll Back Malaria in Africa and the internationally agreed development goals of the United Nations Millennium Declaration, and to take the necessary steps to ensure the recruitment, training and retention of health personnel;**

(c) **To further enhance financial support and development assistance for malaria activities in order to achieve the above-mentioned targets and goals, and to encourage and facilitate the development of new tools to increase the effectiveness of malaria control, especially by providing support to the UNICEF/UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases;**

(d) **To ensure financial sustainability and to increase, in malaria-endemic countries, domestic resource allocation to malaria control, and to create favourable conditions for working with the private sector in order to improve access to good-quality malaria-related services;**

(e) **To pursue a rapid scale-up of prevention by applying expeditious and cost-effective approaches, including targeted free or highly subsidized distribution of materials and medicines to vulnerable groups, with the aim of ensuring that at least 60 per cent of pregnant women receive intermittent preventive treatment and at least 60 per cent of those at risk use insecticide-treated nets, wherever that is the vector-control method of choice;**

(f) **To support indoor residual insecticide spraying, where such intervention is indicated by local conditions;**

(g) **To achieve community participation and multisectoral collaboration in vector control and other preventive actions;**

(h) To develop or strengthen intercountry cooperation to control the spread of malaria across shared borders and migratory routes;

(i) To encourage intersectoral collaboration, both public and private, at all levels, especially in education;

(j) To support expanded access to artemisinin-based combination therapy, including through the commitment of new funds, innovative mechanisms for the financing and national procurement of artemisinin-based combination therapy, and the scaling up of artemisinin production to meet the increased need;

(k) To support the development of new medicines to prevent and treat malaria, especially for children and pregnant women; sensitive and specific diagnostic tests; effective vaccine(s); and new insecticides and delivery modes in order to increase effectiveness and delay the onset of resistance, including through existing global partnerships;

(l) To support coordinated efforts to improve surveillance, monitoring and evaluation systems so as to better track and report changes in the coverage of recommended Roll Back Malaria interventions and subsequent reductions in the burden of malaria.

56. On the basis of the findings of the present report and the recommendations included in the report published by the Millennium Project and those of World Health Assembly resolution 58/2, it is recommended that the General Assembly call upon:

(a) Malaria-endemic countries to establish national policies and operational plans to ensure that at least 80 per cent of those at risk of or suffering from malaria benefit from major preventive and curative interventions by 2010 in accordance with WHO technical recommendations so as to ensure a reduction in the burden of malaria of at least 50 per cent by 2010 and 75 per cent by 2015;

(b) Malaria-endemic countries to assess and respond to the need for integrated human resources at all levels of the health system in order to achieve the targets of the Abuja Declaration to Roll Back Malaria in Africa and the internationally agreed development goals of the United Nations Millennium Declaration, and to take the necessary steps to ensure the recruitment, training and retention of health personnel;

(c) Malaria-endemic countries to ensure financial sustainability and to increase, to the extent possible, domestic resource allocation for malaria control and to create favourable conditions for working with the private sector in order to improve access to good-quality malaria services;

(d) The international community to create conditions through increased financial support to the Global Fund to Fight AIDS, Tuberculosis and Malaria and other mechanisms, for insecticide-treated mosquito nets, insecticides for indoor residual spraying for malaria control and effective antimalarial combination treatments to be fully accessible and free of charge, as public goods, for all populations exposed to malaria;

(e) WHO and UNICEF to lead the international community in an effort to establish universal protection of young children and pregnant women in areas of endemic malaria in Africa with insecticide-treated nets as rapidly as possible, with due regard to ensuring sustainability through full community participation and implementation through the health system;

(f) Malaria-affected countries to encourage intersectoral collaboration, both public and private, at all levels, especially in education, agriculture, economic development and the environment;

(g) The international community to support the development of new medicines to prevent and treat malaria, especially for children and pregnant women; sensitive and specific diagnostic tests; effective vaccine(s); and new insecticides and delivery modes in order to enhance effectiveness and delay the onset of resistance, including through existing global partnerships;

(h) The international community to support coordinated efforts to improve surveillance, monitoring and evaluation systems so as to better track and report changes in the coverage of recommended Roll Back Malaria interventions and subsequent reductions in the burden of malaria.

Notes

[1] *World Malaria Report 2005* (WHO/HTM/MAL/2005.1102), section II, table 6.

[2] Grabowsky, M. et al, "Distributing insecticide-treated bednets during measles vaccination: a low-cost means of achieving high and equitable coverage", *Bulletin of the World Health Organization*, March 2005, Vol. 83, No. 3.